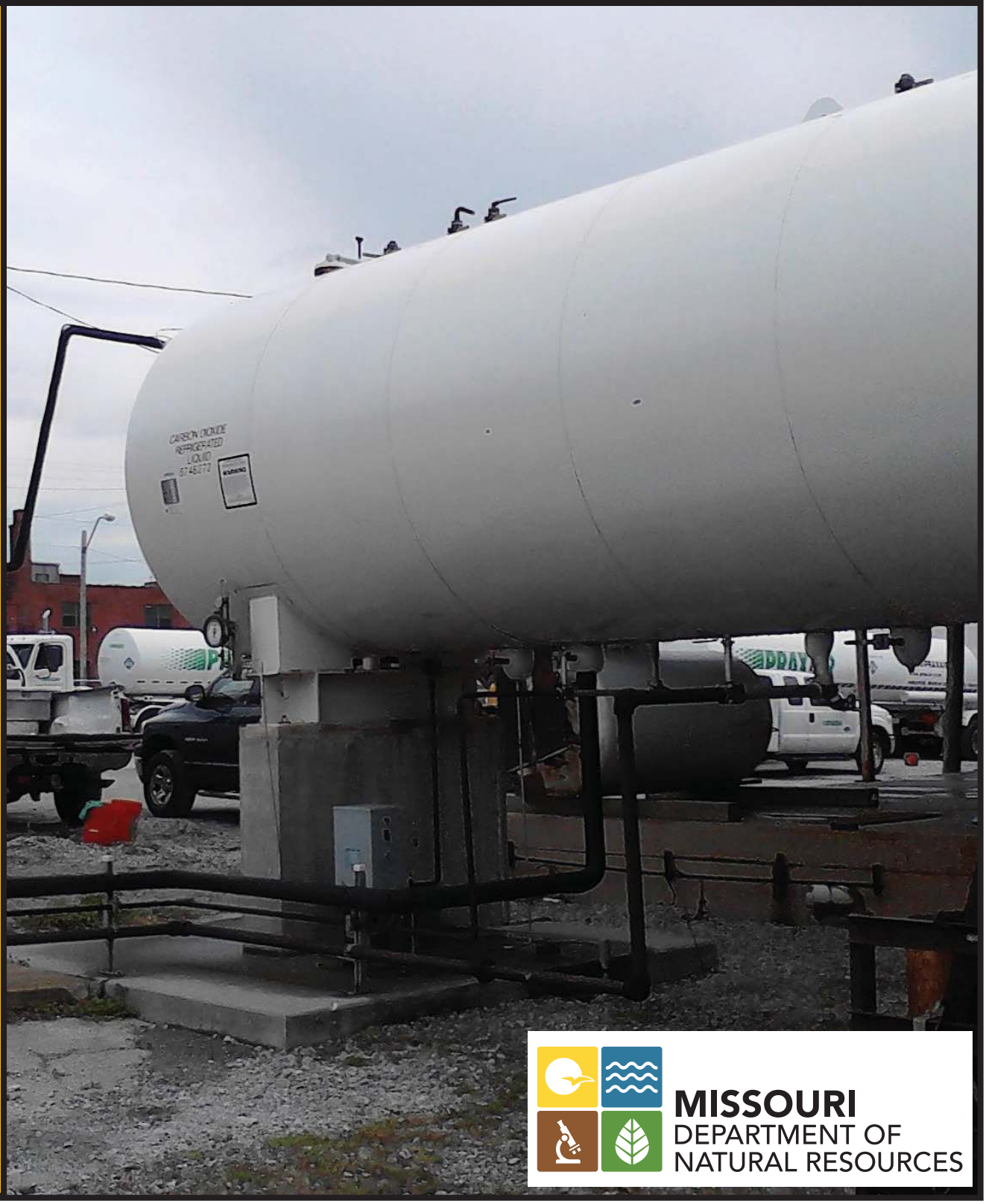
Hazardous Waste Management Commission Report

July through September 2015

Quarterly Report



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

COMMISSIONERS

Hazardous Waste Management Commissioners

Charles "Eddie" Adams, Chair
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"The goal of the Hazardous Waste Program is to protect human health and the environment from threats posed by hazardous waste."

For more information:

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Past issues of the Hazardous Waste Management Commission Report are available online at www.dnr.mo.gov/env/hwp/commission/quarterlyreport.htm.

Missouri Department of Natural Resources
Hazardous Waste Program

Cover Photo: Kirk Welding Supply

Letter from the Director

Dear Commissioners:

During this quarter, the Hazardous Waste Program has reached a significant milestone with the completion of the "No Stricter Than" rulemaking package. As you are aware, this has been a huge undertaking for the program over the past few years. Your adoption of the orders of rulemaking at your August meeting put the rulemaking on schedule to be effective by the end of the 2015 calendar year, as required by HB1251, which was enacted into law in 2012.

While the "No Stricter Than" rulemaking process is nearly complete, there is still much work to do with regard to the new regulations. The process for staff will now turn from the rulemaking effort to the implementation phase. Staff has been very busy updating our checklists to reflect the changes in the requirements in addition to updating our Web pages, fact sheets and guidance documents to remove outdated information and update them with the current requirements. This has been a significant effort in light of the fact many of the regulations rescinded were in place for more than 30 years, and were the basis of many regulatory interpretations that have been made over that time.

In addition to updating our many guidance documents and fact sheets, program staff is also working to train our regional office inspectors on these new requirements as well as develop outreach efforts such as mailings and webinars for the regulated community to ensure they are informed of these upcoming changes as well. As you are aware, there are many changes to the rules and it will take some time for staff as well as the regulated community to adjust to the new requirements. We are certainly doing our best to help make the transition for the regulated community as smooth as possible.

Part of the language in HB1251 also required the department to develop an electronic reporting system to allow large quantity generators to submit hazardous waste summary report information on an annual basis rather than quarterly. The system went live on July 1, 2015. This web-based system was created to allow all generators, both large and small, and facilities to report annually, and was designed to help prevent the submittal of incomplete or invalid data, which reduces the amount of time spent completing and processing the reports. We believe this will be a big efficiency gain for us once generators are familiar with the system and begin using it on a regular basis.

While "No Stricter Than" has been a significant focus for our program the past several years, and while it will continue to be an issue for us in the foreseeable future as we work through the implementation of these new rules, it is only one of the many focus areas for the program. There are many other efforts, as you can see in this report, being undertaken by the program. I hope you enjoy reading about them in this edition of the Quarterly Report.

Sincerely,

David J. Lamb

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Fiscal Year 2015 Budget

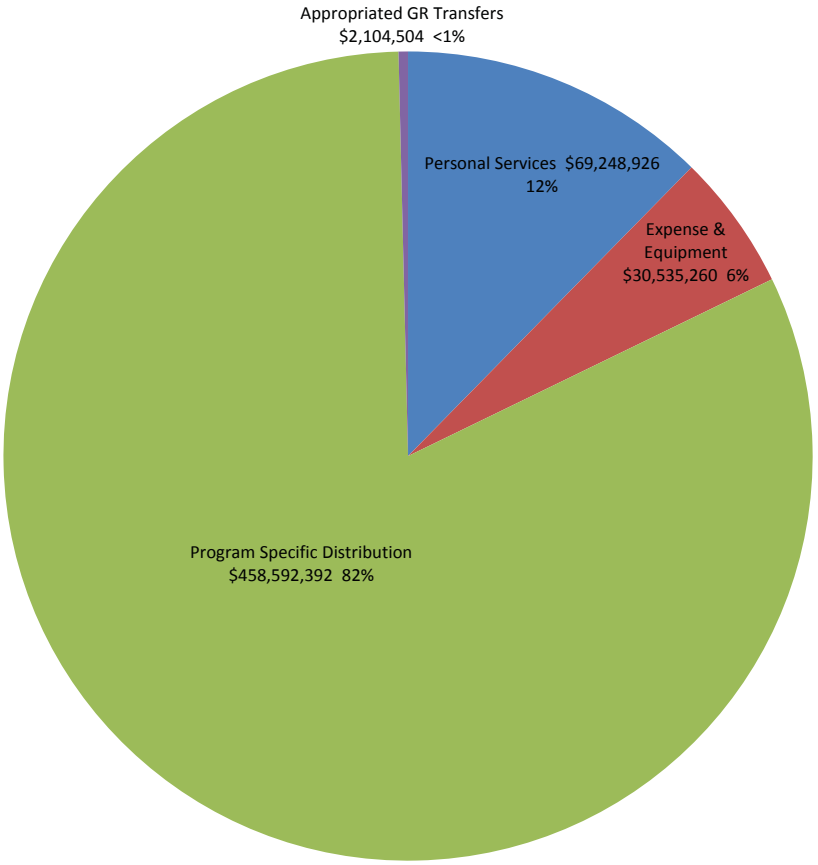
The Budget and Planning Section is responsible for financial management of the Hazardous Waste Program. It is this section's responsibility to coordinate the program's budget requests each fiscal year (FY). The state is currently operating in FY 2016, which began on July 1, 2015, and runs through June 30, 2016.

The process to establish the FY 2016 budget began in July 2014 when the state budget director issued budget preparation instructions. The Budget Program, within the Division of Administrative Support, coordinates the department's overall operating, real estate and capital improvements budgets. The Missouri Department of Natural Resources' operating budget (HB 6) is available online at www.oa.mo.gov/budget-planning/budget-information/2016-budget-information/2016-department-budget-requests-governor.

Each state agency is required to submit its completed budget request to the state budget director annually by Oct. 1. The governor may make changes to these department budget requests and releases the governor's recommended budget in conjunction with the governor's State of the State address in January.

The department's FY 2016 operating budget is in House Bill 6, which was signed by the governor on May 8, 2015. The department's FY 2017 budget request was submitted by Oct. 1, 2015.

FY 2016 Truly Agreed and Finally Passed DNR Operating Budget (HB6)*
$560,481,082

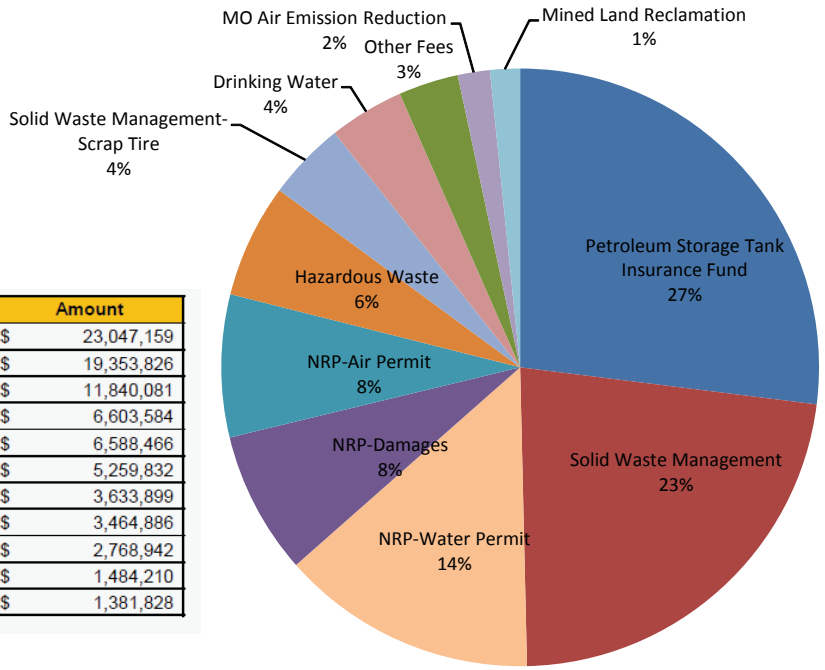


*Includes appropriated General Revenue transfers

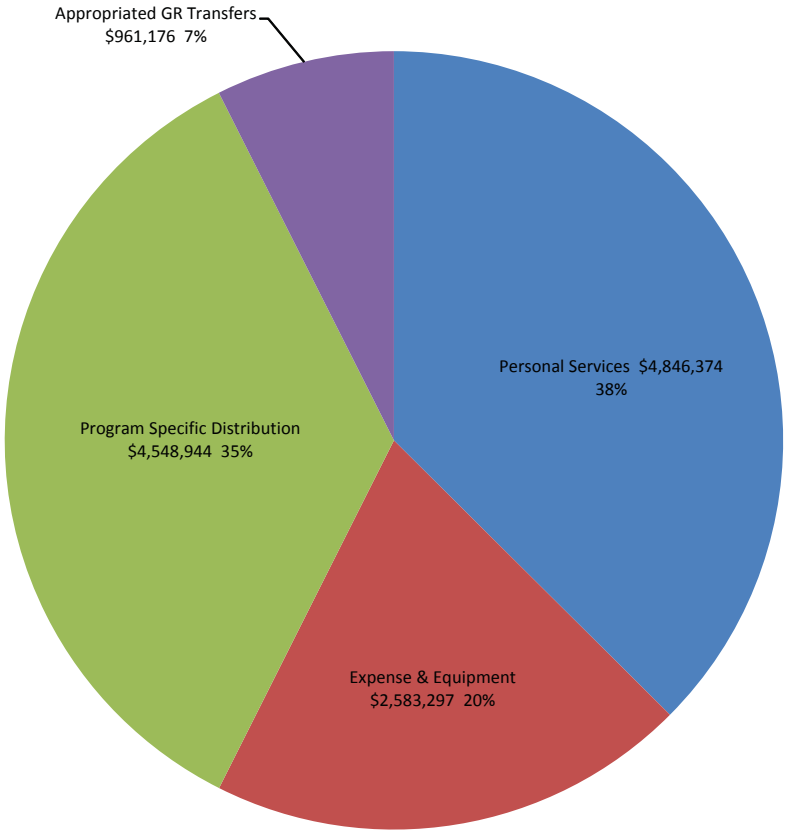
Missouri Department of Natural Resources - Hazardous Waste Program

FY 2016 Truly Agreed and Finally Passed DNR Budget - Environmental Fee Fund
Appropriations $85,426,713

Fund	Amount
Petroleum Storage Tank Insurance Fund	$ 23,047,159
Solid Waste Management	$ 19,353,826
NRP-Water Permit	$ 11,840,081
NRP-Damages	$ 6,603,584
NRP-Air Permit	$ 6,588,466
Hazardous Waste	$ 5,259,832
Solid Waste Management-Scrap Tire	$ 3,633,899
Drinking Water	$ 3,464,886
Other Fees	$ 2,768,942
MO Air Emission Reduction	$ 1,484,210
Mined Land Reclamation	$ 1,381,828

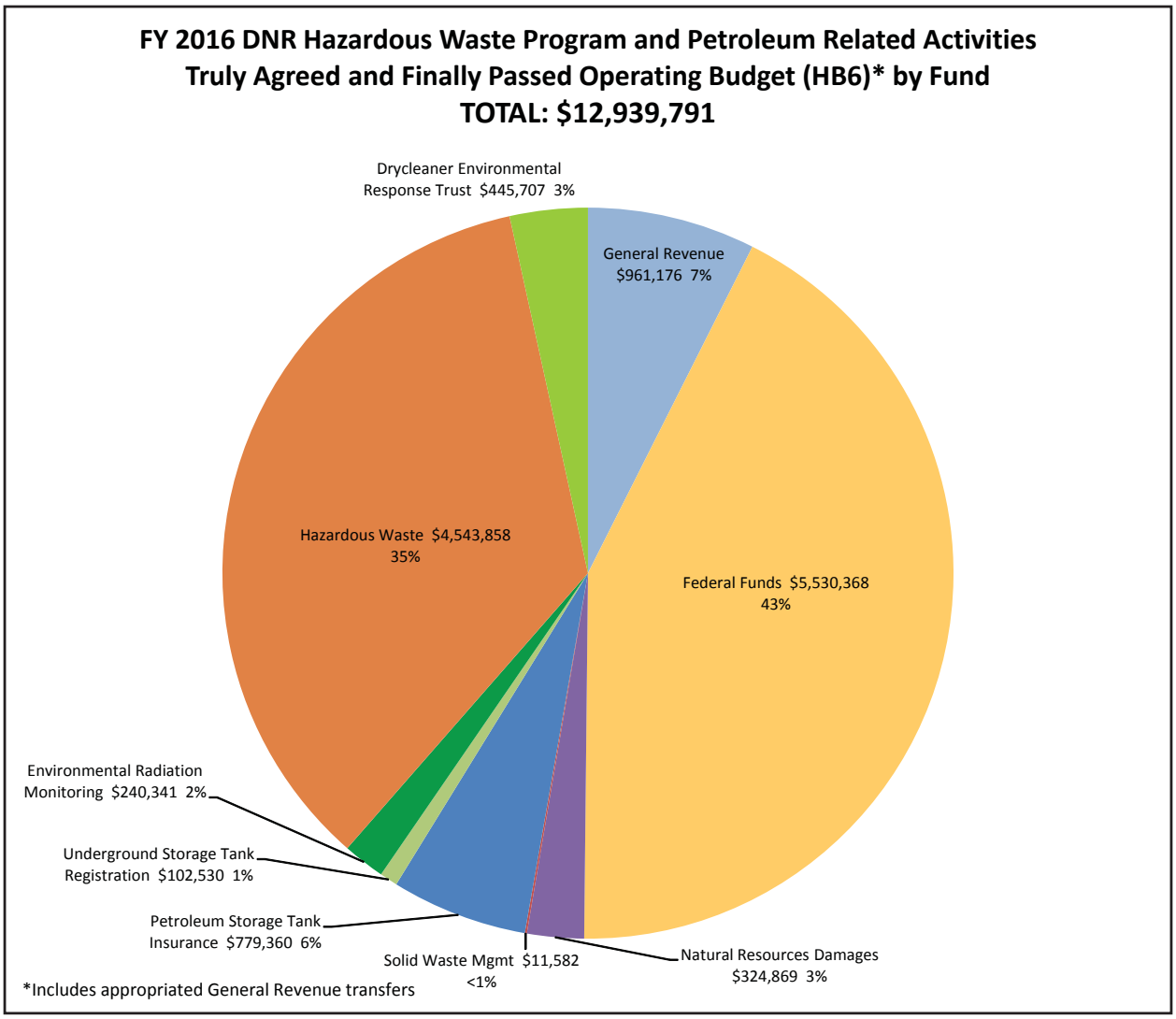


FY 2016 DNR Hazardous Waste Program and Petroleum Related Activities Truly Agreed and Finally Passed Operating Budget (HB6)*
TOTAL: $12,939,791



*Includes appropriated General Revenue transfers

Missouri Department of Natural Resources - Hazardous Waste Program



Brownfields/Voluntary Cleanup Program Certificates of Completion

Brownfields are real property, the expansion, redevelopment or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant or contaminant. Cleaning up and reinvesting in these properties protects the environment, reduces blight and takes development pressures off greenspaces and working lands. Through this program, private parties agree to clean up a contaminated site and are offered some protection from future state and federal enforcement action at the site in the form of a "no further action" letter or "certificate of completion" from the state.

The Brownfields/Voluntary Cleanup Program (BVCP) issued four certificates of completion for various sites from July through September 2015. This brings the total number of certificates of completion issued to 769.

Amber Lakes (Lot 371, 372, 405, 406 and 413) - Kansas City

The Amber Lakes Site is located in Kansas City. Amber Lakes is the site of a buried pipeline that ruptured on March 11, 2008, releasing 7,100 gallons of gasoline. The site is part of a residential subdivision that has been developed for new home construction. During the initial response action, 3,200 tons of impacted soil were removed and 30,000 gallons of impacted groundwater was collected from two recovery trenches. An initial investigation showed there was some residual impact to soil and groundwater from the gasoline release.

Amber Lakes Lot 371 and 372: After the initial emergency response, a permanent monitoring well and an interceptor trench to capture contaminated groundwater were installed on this property. The well had no detections of contaminants. The trench initially had some detections, but over time they declined to undetected levels. The trench was removed and soil excavated. The soil at the bottom of the excavation was sampled, and no contaminants were detected. The department determined these sites are safe for their intended use.

Amber Lakes Lot 405: Initial soil and groundwater samples showed that elevated levels of petroleum constituents were present in soil and groundwater at the site. To further assess groundwater, permanent groundwater monitoring wells were installed on the property. The result of sampling these wells showed there were no contaminants in groundwater above the risk-based target levels (RBTLs) for residential use, according to the 2006 Missouri-Risk Based Corrective Action (MRBCA) guidance. One area of the lot had soil with contaminants above the residential use RBTLs. This soil was excavated, disposed of and the area was backfilled with clean soil. The department determined the site is safe for its intended use.

Amber Lakes Lot 406: The Amber Lakes Lot 406 site is located at 10122 N. Ash Ave., Kansas City. Initial soil and groundwater samples showed elevated levels of petroleum constituents were present in soil and groundwater at the site. None of the soil samples were above the RBTLs for residential use,

according to MRBCA guidance. To further assess groundwater, permanent groundwater monitoring wells were installed on the property. One well had persistently high levels of contaminants due to residual petroleum product that was the conduit for gasoline to flow away from the original spill site. The area of petroleum product was excavated, and all soil, product and contaminated groundwater removed were disposed of. Some soil contamination remained at the bottom of the excavation and could not be excavated, but it was below the previously measured depths to groundwater, so groundwater was sampled to determine if any risk from petroleum contamination remained. A well was reinstalled in this location and was monitored for five quarters. This monitoring showed contaminant levels in groundwater met the RBTLs for residential use. The department determined the site is safe for its intended use.

Amber Lakes Lot 413: The Amber Lakes Lot 413 site is located at 10119 N. Maywood Ave., Kansas City. None of the soil samples were above the RBTLs for residential use, according to the MRBCA guidance. One groundwater sample was, so a permanent groundwater monitoring well was installed in this location. Samples taken from this well were non-detect for contaminants. Vapor monitoring wells were also installed on the property. Samples from these wells were also below the RBTLs for residential use. The department determined that the site is safe for its intended use.

West Meadows - Springfield

Site investigations revealed the presence of heavy metals (lead, arsenic and cadmium) and polycyclic aromatic hydrocarbons (PAHs) in historic rail yard fill at the site, which consisted of coal cinders and other debris and waste. Shallow bedrock wells installed adjacent to the east and other sites to the east suggested the groundwater beneath the site may be contaminated with hydrocarbons from offsite sources at concentrations exceeding domestic use (drinking water) target levels. Risk Assessment for the site was performed using the MRBCA.

West Meadows Site 2: The West Meadows-Site 2 is located north of College St. between Olive St. and Fort St. in Springfield. The 1.92-acre property is a portion of the 14-acre West Meadows rail yard donated by Burlington Northern Santa Fe (BNSF) Railroad to the City of Springfield as part of Jordan Valley Park.

Fill material was excavated to the depth of native soil. Approximately 15,000 tons of low-level contaminated fill (exceeding MRBCA unrestricted/residential target levels) was consolidated and capped on West Meadows Site 7. 290 tons of higher-level contaminated fill was disposed of at a permitted landfill. Soil at the site met target levels appropriate for non-residential use with the exception of certain areas requiring ongoing management. Groundwater contamination from off-site sources did not require active remediation in order to safely reuse the site, provided the groundwater is not used. The department determined the site is safe for its intended use.

West Meadows Site 3: The West Meadows-Site 3 is also located north of College St. between Olive St. and Fort St. in Springfield. The 2.36-acre property is a portion of the 14-acre West Meadows property.

Approximately 52,300 tons of low-level contaminated fill (exceeding MRBCA unrestricted/residential and/or non-residential target levels) was consolidated and capped on West Meadows Site 6. Two hundred tons of higher-level contaminated fill was disposed of at a permitted landfill. Soil at the site met target levels appropriate for non-residential use with the exception of certain areas requiring ongoing management. Groundwater contamination from off-site sources did not require active remediation in order to safely reuse the site, provided the groundwater is not used. The department determined the site is safe for its intended use.

Kirk Welding Supply, Inc. - Fremont-Kansas City

The Kirk Welding Supply, Inc.-Fremont site is located at 3820 Fremont Ave. in Kansas City. The 2.5-acre site was first developed from residential use to industrial use by Kirk Welding Supplies in 1975 and was used for the production of acetylene from 1975 through the early 1980s. Contaminants of concern for the site include total petroleum hydrocarbons (TPH)-gasoline range organics (GRO), TPH- diesel range organics/oil range organics (DRO/ORO) and metals (aluminum, arsenic, beryllium, copper, lead, manganese, nickel and vanadium). The comparison of analytical results showed TPH was either not detected or detected in concentrations below MRBCA default target levels (DTLs) in soil or groundwater. All metal concentrations in soil and groundwater were below the MRBCA Tier 1 RBTLs for residential land use in soil type 3 (clay soils) with the exception of arsenic in subsurface soil. The only exposure pathway for arsenic in subsurface soil is through dermal contact for construction workers; however concentrations are below the Construction Worker RBTLs. The department determined the site is safe for its intended use.

Kirk Welding Supply, Inc. - Holmes

The Kirk Welding Supply Inc., Holmes site, is located at 1608 Holmes in Kansas City. The property was developed into commercial/ industrial use including a radiator and auto repair facility between 1909 and 1963. Preliminary investigation indicated soil and groundwater on-site was contaminated with heavy metals, trichloroethylene (TCE), benzo(a) pyrene and methylene chloride.

Groundwater TCE was delineated to appropriate levels onsite, and was at concentrations sufficiently below the Tier 1. Soil Type 2 non-residential level that plume stability was readily determined. Arsenic, lead and benzo(a)pyrene discovered in the surficial soil in the middle of the site above non-residential levels will be addressed through a soil management plan and through the maintenance of the in-place asphalt barrier. The department determined the site is safe for its intended use.

Carondelet Commons Lot 1 - St. Louis

The Carondelet Commons Lot 1 site is located at 8718 S. Broadway and 316 E. Catalan St. in St. Louis. This property was formerly the location of Laclede Gas Company and forms the western boundary of the former Carondelet Coke Corporation site. Approximately 61 butane and propane aboveground storage tanks (ASTs) were formerly located on the property.

Concentrations of PAHs were detected in surface soils at this site at levels exceeding the MRBCA guidance residential RBTLs. No contamination exceeding RBTLs was detected in either subsurface soil or groundwater. Areas of excessive surface soil contamination were excavated and properly disposed. The site meets the RBTLs for unrestricted land use. The department determined the site is safe for its intended use. The site will be redeveloped for commercial use.

Drycleaning Environmental Response Fund Issued Certificate of Completion

U.S. Cleaners (Lindbergh Blvd.)

The department's Drycleaning Environmental Response Trust (DERT) Fund issued a certificate of completion for the former U.S. Cleaners site, 15 Ronnie's Plaza (5300 S. Lindbergh Blvd., Suite 15), St. Louis. Operation of cleaning businesses ran from 1999 to September 2011. A Phase II Environmental Site Assessment identified soil inside the building and at the back of the building contaminated with chlorinated solvent at levels higher than the default target levels.

Tetrachloroethylene (PCE) was detected in soil at levels exceeding the MRBCA residential RBTLs, and in groundwater at levels exceeding residential and non-residential RBTLs. The contamination was successfully delineated and a Tier 1 risk assessment showed soil representative concentations did not exceed the RBTLs. Regenesis 3D Microemulsion® and Bio-Dechlor INOCULUM Plus® was injected into the groundwater in accordance with an approved remedial action plan. After injection, the PCE levels dropped to below residential RBTLs. Subsequent quarterly monitoring and BIOCHLOR analysis showed all contaminant concentrations in all monitoring wells to be stable and/or shrinking. The department determined the site is safe for its intended use.

The site will be redeveloped for commercial use.

Through the DERT Fund, private parties agree to investigate and, if necessary, clean up a contaminated site, and are offered some protection from future state enforcement action at the site in the form of a "certificate of completion" from the state. Participants in the DERT Fund process are also eligible for reimbursement of eligible investigative and/or cleanup expenses.

Brownfields Conference

The annual Missouri Brownfields Conference was held at the Tan-Tar-A resort in partnership with the Missouri Waste Control Coalition Conference (MWCC) on July 13, 2015. The MWCC conference hosted more than 500 environmental professionals from across the state. The Brownfields conference portion hosted approximately 100 people who received information on environmental assessments, how to identify potential brownfields, financial assistance and many more related brownfield topics. Since this conference, the number of applications received monthly for our Brownfield Assessment Program has doubled. The BVCP received many positive responses from local community leaders and environmental professionals stating the conference was beneficial in learning the path to brownfield redevelopment.

Joplin Bus Tour

On Aug. 26, 2015, the Missouri Brownfields Program held our first mobile workshop. Approximately 40 community representatives from southwest Missouri toured different brownfield sites from Joplin to Springfield. This mobile workshop allowed participants to see brownfield properties in different stages of redevelopment. These sites ranged from non-environmentally assessed brownfields to brownfields where remediation has been completed and the site redeveloped.

This tour started out at the Gryphon Building in Joplin, a Voluntary Cleanup Program site, which has been completely remediated and redeveloped. After touring the Gryphon Building, the group traveled to Springfield, via charter bus, to see other sites that were or are currently enrolled in our Voluntary Cleanup Program or Brownfield Assessment Program. While in Springfield, the mobile workshop had lunch at one of the first sites to receive national brownfield cleanup funding, Hammons Field, home of the Springfield Cardinals. After lunch, the tour continued to different brownfield sites with assistance from the Springfield's brownfields coordinator, Olivia Hough. This conference was a success, and the feedback received tells us the mobile workshop is a good way to help people understand the brownfield process because they get to see the remediation and redevelopment of these sites first hand.

Sites in Brownfields/Voluntary Cleanup Program

Month	Active	Completed	Total
July 2015	237	766	1,003
August 2015	236	768	1,004
September 2015	240	769	1,009

New Sites Received: 18

July

Fiddle Creek Road, Labadie
Springfield FMGP - Subsite #3, Springfield
Brookfield Building, Kansas City
Hopkins Seed and Chemical Company (former), Qulin
Frankel, Frank & Co. Building, Kansas City
Shaw Neighborhood Housing Corporation - Auto Repair Shop, St. Louis
One Hour Cleaners, Joplin
200 Block Commons, Joplin

August

Fenton Logistics Park, Fenton
Mary Mart Shopping Center - Outlot, Maryville
Explorer Pipeline-Owensville, Owensville
Central Meat Packing (former), Cape Girardeau
National Geospatial Intelligence Agency, St. Louis

September

East Ellis Hall - UCM, Warrensburg
Cornerstone Church (former), Springfield
North Sarah Phase III, St. Louis
Two Light Luxury Apartments, Kansas City
Nu Look Car Care, Independence

Certificates Issued: 10

July

West Meadows-Site 2, Springfield
West Meadows-Site 3, Springfield
Amber Lakes Lot 371, Kansas City
Amber Lakes Lot 372, Kansas City
Amber Lakes Lot 405, Kansas City
Amber Lakes Lot 406, Kansas City
Amber Lakes Lot 413, Kansas City

August

Kirk Welding Supply, Inc.-Fremont, Kansas City
Carondelet Commons Lot 1, St. Louis

September

Kirk Welding Supply, Inc.-Holmes, Kansas City

Drycleaning Environmental Response Trust Fund

The department's DERT Fund provides funding for the investigation, assessment and cleanup of releases of chlorinated solvents from drycleaning facilities. The two main sources of revenue for the fund are the drycleaning facility annual registration surcharge and the quarterly solvent surcharge.

Registrations

The registration surcharges are due by April 1 of each calendar year for solvent used during the previous calendar year. The solvent surcharges are due 30 days after each quarterly reporting period.

Calendar Year 2014	Active Drycleaning Facilities	Facilities Paid	Facilities in Compliance
January - March 2015	134	60	44.78%
April - June 2015	134	111	82.84%
July - September 2015	134	116	86.57%

Calendar Year 2015	Active Solvent Suppliers	Suppliers Paid	Suppliers in Compliance
January - March 2015	11	9	81.82%
April - June 2015	11	8	72.73%
July - September 2015	11	9	81.82%

Cleanup Oversight

Calendar Year 2015	Active Sites	Completed Sites	Total
January - March 2015	20	15	35
April - June 2015	20	15	35
July - September 2015	19	16	35

New Sites Received: 0

Sites Closed: 1

U.S. Cleaners (Lindbergh Blvd.)
Closed August 2015

Reimbursement Claims

The applicant may submit a reimbursement claim after all work approved in the work plan is complete and the DERT Fund project manager has reviewed and approved the final completion report for that work. The DERT Fund applicant is liable for the first $25,000 of corrective action costs incurred.

During this quarter, no claims were received, reviewed or processed.

Total reimbursements as of Sept. 30, 2015: $2,784,107.05

DERT Fund Balance as of Sept. 30, 2015: $329,861.49

The Five-Year Review

The Federal Facilities and Superfund sections of the department participate in a process known as the Five-Year Review (FYR). FYRs are conducted by the lead agency for the site, either the U.S. Environmental Protection Agency (EPA) or the department, with input from the support agency (again, either EPA or the department) and other experts assembled as part of the FYR team. FYRs are conducted at sites on EPA's Superfund National Priorities List (NPL) and sites deleted from the NPL with hazardous substances still remaining in place to evaluate the implementation and performance of a remedy at a site. The review will determine if the remedy is, or when complete, will be, protective of human health and the environment. FYRs are most often implemented at sites where waste is left onsite at concentrations not allowing unlimited use and unrestricted exposure (UU/UE), which means there are no restrictions placed on the potential use of land or other natural resources. If, however, the selected remedy relies on restrictions of land, groundwater or surface water by humans or if any engineered barrier is part of the remedy, then the use has been limited and a FYR should be conducted. As needed, FYRs identify issues and recommendations that must be addressed for site remedies according to specified schedules. Written reports of FYR's are prepared by the reviewer with input from the review team. Some FYRs are also reviewed, commented on and approved by EPA staff and support agency review team staff.

What is a Five-Year Review?

There are two types of FYR's: statutory and policy. Statutory reviews are required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) at post-Superfund Amendments and Reauthorization Act of 1986 (SARA) remedial actions that upon completion of the action, leave hazardous substances, pollutants or contaminants on site. Policy reviews are compelled for pre-SARA remedial actions leaving hazardous substances, pollutants or contaminants on site, and at removal-only National Priorities List (NPL) sites where hazardous substances, pollutants or contaminants were left on site at levels that do not permit UU/UE. FYR's continue throughout the life of the site until hazardous substances, pollutants or contaminants no longer remain on site at levels that do not allow for UU/UE.

How Does the Five-Year Review Work?

To assess the protectiveness of the remedy, human health risks, ecological risks and the general performance of the selected remedy must be evaluated. To facilitate the FYR evaluation, six components have been established: 1) community involvement and notification, 2) document review, 3) data review and analysis, 4) site inspection, 5) interviews and 6) protectiveness determination. The reviewer and others on the review team use these collective components to assess the remedy's performance, to arrive at a determination of the remedy's protectiveness and to identify any issues and recommendations needing to be addressed whether or not the remedy is determined to be protective.

The FYR begins with the community involvement component. In the initial planning, the appropriate level of community involvement is determined and all potentially interested parties are notified the FYR will be conducted. Public notices are usually issued when a FYR is initiated to allow for public participation and comment in the process. Likewise, at the conclusion of the FYR, interested parties are notified, usually through public notice, when the FYR has been completed and are provided with the results of the FYR.

Next, FYR team conducts a review of site documents; including records of decision, explanations of significant differences, consent decrees, administrative orders on consent, site investigations, remedial design and construction, and remedy performance to obtain information to assess performance and protectiveness of the response action and identify any issues and recommendations needing to be addressed.

A review of sampling and monitoring plans and results from monitoring activities, operation and maintenance reports or other documentation of remedy performance, including previous FYR reports and follow up on previously identified issues and recommendations is performed. The data obtained from this review will aid in the technical analyses and will help form the protectiveness statement included in the FYR report. Data obtained will have a significant impact on findings and conclusions, the protectiveness statement, and any issues and recommendations identified.

To clarify and further assess the protectiveness of a remedy, EPA's Office of Solid Waste and Emergency (OSWER) "Comprehensive FYR Guidance" defines five protectiveness categories for use in assessments: protective, short-term protective, will be protective, protectiveness deferred and not protective.

OSWER Categories for Evaluating the Protectiveness of a Remedy

Protective	Short-term Protective	Will be Protective	Protectiveness Deferred	Not Protective
Answers to all questions (questions 1, 2 and 3) provide sufficient data and documentation to conclude the remedy is functioning as intended.	*Answers to all questions provide sufficient data and documentation to conclude the human and ecological exposures are currently under control and no unacceptable risks are occurring.*	*Answers to all questions provide sufficient data and documentation to conclude the human and ecological exposures are under control, no unacceptable risks are occurring and the remedy under construction is anticipated to be protective.*	*Answers to all questions do not provide sufficient data and documentation to conclude all human and ecological risks are currently under control and no unacceptable exposures are occurring.*	*Answers to all questions provide adequate data and documentation to conclude the human and/or ecological risks are not currently under control.*

Site inspections are another important component of the FYR. On a site inspection, the reviewer can learn information about a site's current status and visually confirm and document the conditions of the remedy and the site. Sampling and analyses may be conducted as part of a site inspection, if needed.

Interviews with site managers, personnel, local, state and federal regulators and technical experts familiar with the site and people who live or work near the site can provide valuable information about its status and can help identify issues with a remedy.

The final component of the FYR is the assessment of the protectiveness of the remedy. To assess the protectiveness of the remedy, human health risks, ecological risks and the general performance of the selected remedy (with respect to the design) must be evaluated. To facilitate the evaluation, a technical assessment of a remedy is conducted to answer the following three questions:

1. Is the remedy functioning as intended?
2. Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives still valid?
3. Has any other information come to light which could call into question the protectiveness of the remedy?

After the reviewer answers questions A, B and C, a protectiveness determination is made and a protectiveness statement is formulated for the FYR report. The determination of whether the remedy is

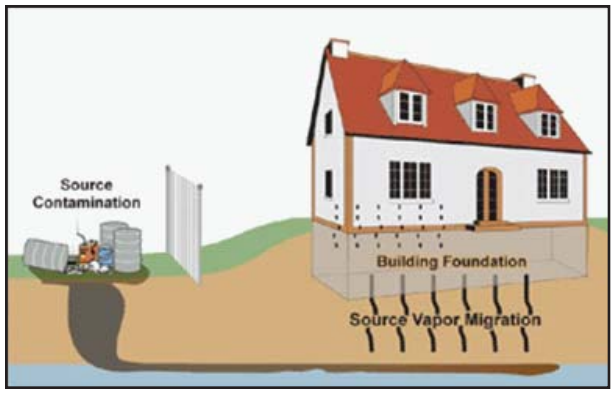
or remains protective of human health and the environment will usually be based on answers to these questions. Although protectiveness generally is defined by the risk range and hazard index, the answers to questions A, B and C may identify other factors and issues that may impact the protectiveness of a remedy. If the answers to A, B and C are yes, yes, and no, in that order, then the remedy will usually be deemed protective. However, if answers are different or are given in any other order, the remedy may be determined to be one of the five different protectiveness categories. If a remedy is determined to be less than protective or not protective, work will need to be conducted to render the existing remedy protective. This may include identification of specific issues and recommendations to be implemented at the existing remedy, conducting a remedy optimization study or may even involve conducting additional or new remedial investigations and feasibility studies, and possibly implementing a new or significantly modified remedy.

Once a protectiveness determination is made, the FYR is signed and placed in a local repository. Community members are notified that the report is available. The signature date is the date that will trigger the next FYR, unless events at the site or regulatory changes necessitate conducting a FYR earlier in the cycle. Addendums may also be completed between FYR's as issues and recommendations are implemented affecting the protectiveness statement.

What is Vapor Intrusion; why include it in the Five-Year Review Process?

Vapor intrusion is the general term given to migration of hazardous vapors from a volatile subsurface contaminant source, such as contaminated soil or groundwater. Through openings in the structures' foundation such as cracks in the slab, gaps around utility lines or elevator shafts. Contaminants that may result in vapor intrusion include volatile organic compounds (VOCs), some semi-volatile organic compounds and some inorganic analytes such as elemental mercury, radon and hydrogen sulfide. Radon is the most common naturally occurring vapor intrusion concern and manufactured VOCs typically pose the most common man-made vapor intrusion concern at Superfund and other contaminated sites. Having a complete vapor intrusion pathway (vapor migrating from subsurface to indoor air) means humans are exposed to vapors originating from site contamination. Indoor vapors can be mitigated using building ventilation systems similar to those commonly used for radon. For new buildings, vapor barriers, in lieu of or in combination with mitigation systems, can be installed as part of building construction.

Over the last ten years, the topic of vapor intrusion from environmental media (mainly soil, unsaturated and/or fractured bedrock and groundwater) into residential and other buildings has become a larger focus for EPA and in turn, the department. A combination of the commutative characteristics of potentially hazardous vapors and progressively more conservative vapor screening levels established by EPA have brought about an increased awareness of the importance of assessing this pathway for potential harmful effects on human health and the environment.



Some preferential pathways are: window wells, tie rods, mortar joints, top of wall, foundation wall cracks, floor and wall joints, water lines, sump pumps, floor cracks and floor drains.

EPA published Comprehensive Five-Year Review Guidance in 2001. In 2012, a supplemental guidance was published by OSWER, recognizing the need for the assessment of protectiveness of remedies for vapor intrusion at Superfund NPL sites during the FYR process. It also provided recommendations for assessing protectiveness at sites where a vapor intrusion remedy had not

Pictured above: conducting helium test of sample port prior to split sample collection. Vapor intrusion is a whole new pathway we need to examine. Previously, unless there was exposure to vapors by bringing the vapor indoors through showering or washing clothes or dishes, vapor intrusion simply did not exist.

been implemented and: 1) the vapor intrusion pathway was never characterized or adequately characterized; or 2) changes in site conditions since the last FYR have potentially led to a complete vapor intrusion pathway. EPA has been working to finalize vapor intrusion guidance documents, and is considering adding assessment of vapor intrusion risk to the criteria for adding sites to the NPL.

Vapor intrusion was added to the FYR process because sites with remedies implemented prior to 2004 likely did not evaluate the potential for an indoor contamination pathway. Sites with remedies implemented after 2004 may have evaluated vapor intrusion, but due to the continual evolution of science and risk screening levels, the FYR provides the vigilance needed to ensure the sites remain protected. Including the vapor intrusion pathway as part of the FYR allows the FYR team to consider whether there is adequate, appropriate data to evaluate the pathway prior to beginning the FYR or, if no or inadequate data are available, recommendations for gathering appropriate data relevant to potential vapor intrusion and response action if needed can be included in the FYR.

Why is Vapor Intrusion a Problem and What are the Assessment Challenges?

Vapor intrusion is a problem because VOC contamination is abundant in subsurface media at many Superfund, petroleum and other contaminated sites and may be harmful to humans when present above screening levels and inhaled. Soil, groundwater and other subsurface environmental media become contaminated with VOCs when hazardous chemicals such as gasoline, diesel fuel, dry cleaning solvents and other chemicals leach into the soil from purposeful dumping and accidental spillage (such as gasoline leaking out of an old car). Additionally, vapor plumes are gaseous and vapors can move and shift along preferential pathways making assessment difficult. Vapor migration from the subsurface to indoor air is often influenced by things that cannot be controlled, such as the soil type, geology and hydrology of the site, building characteristics and seasonal changes in temperature and groundwater levels. Due to these variables and the challenges they present, in 2015 EPA issued updated recommendations from the 2002 draft guidance, titled Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air, and now recommends using multiple lines of evidence to adequately evaluate the vapor intrusion pathway and associated potential risks to human health.

Currently, vapor intrusion is examined in a bottom to top model. Groundwater is examined for VOCs, semi-volatile VOCs and other vapor-forming chemical contamination. If contamination is found, soil gas is measured. If VOCs are found in soil gas above protective levels, the sub-slab is tested first, then, if needed, indoor air is tested. Future impacts to vapor intrusion measurement include the transition to consideration of multiple lines of evidence. For instance, if highly volatile compounds are found in lower concentrations, this evidence may indicate a smaller chance of vapor intrusion, although it is generally recommended to conduct multiple rounds of sampling to determine actual exposure risks. Other categories of consideration in a multiple line of evidence model will be the density and direction of layers of media, moisture content, depth of water table and contaminant concentration in soil or groundwater.

Changes for Department Staff

Changes to the way the FYR is conducted have affected department project management staff:

- Instead of relying solely on the potentially responsible party (PRP) to sample for vapor intrusion, project managers are now splitting samples with them or collecting duplicate samples. Examples of PRPs are private industries for non-Federal Facilities sites and the U.S. Army, Department of Energy, General Services Administration, the U.S. Department of Agriculture and others for Federal Facilities sites.
- Screening levels have been lowered for some contaminates, but have been raised for others, with resulting effects.
- The attenuation factor was recently increased, reducing the estimate of the amount of contaminant migrating from the sub-slab into a building interior. The attenuation factor was 0.1 in the past, and now it is 0.3. As a result, previous studies may have identified excess risk, but now, due to the increased attenuation of contaminates, excess risk may no longer be present.

Changes in the screening level (toxicity), attenuation factor, multiple lines of evidence, and other factors in current guidance can have a significant effect on risk calculations and must be carefully evaluated during a FYR. Due to the dynamic nature of the science of vapor intrusion and the toxicity of the chemicals involved, project managers may be uncertain if decisions made regarding vapor intrusion are final. They must remember sites that were closed as they may need to be reevaluated later due to these changes. Site managers must also consider how long-term stewardship conducted at sites where buildings have had vapor intrusion mitigation systems installed will be addressed. Institutional controls such as environmental covenants containing site-specific property activity and use limitations may be required, as well as ongoing environmental monitoring and operation, monitoring and maintenance of engineering controls. Sites with groundwater and other subsurface contamination remaining in place must always be evaluated as the science continues to evolve.

Assessing vapor intrusion is now a constantly evolving process. Screening levels fluctuate, which leads to outdated vapor intrusion guidance and FYRs, and the necessity for updating them to assess the protectiveness of the remedy. Previously closed sites may not meet new screening levels. Project managers are learning to adapt and change with current guidance and new screening levels. Adding the vapor intrusion pathway to the FYR is helping project managers protect our state, our resources and our people.

Jim Harris and Jennifer Lamons of the Federal Facilities Section, and Bob Hinkson and Dennis Stinson of the Superfund Section contributed to this article. The following guidance documents were consulted in the drafting of this report:

OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway From Subsurface Vapor Sources to Indoor Air. OSWER Publication 9200.2-154 United States Environmental Protection Agency. Retrieved from: http://www2.epa.gov/sites/production/files/2015-09/documents/oswer-vapor-intrusion-technical-guide-final.pdf

Woolford, James E. and Cheatham, Reggie (2012). Clarifying the Use of Protectiveness Determinations for Comprehensive Environmental Response, Compensation, and Liability Act FYR's. OSWER Directive 9200.2-111 United States Environmental Protection Agency. Retrieved from: http://semspub.epa.gov/src/collection/HQ/SC31220

Dawson, Helen (2015), Vapor Intrusion (VI), What is it? Why is it a Problem? Regulatory Status? American Bar Association. Retrieved from: http://www.americanbar.org/content/dam/aba/administrative/environment_energy_resources/committees_dch/SNRDL_vapor_intrusion_042715.authcheckdam.pdf

Five-Year Review Process in the Superfund Program. OSWER 9355.7-08FS United States Environmental Protection Agency. Retrieved from: http://www2.epa.gov/superfund/superfund-fyr-memoranda-and-fact-sheets

Regional Office Hazardous Waste Compliance Efforts

- Conducted 92 hazardous waste generator compliance inspections:
  - *14 at large quantity generators*
  - *38 at small quantity generators*
  - *26 at conditionally exempt small quantity generators*
  - *11 at E-waste recycling facilities*
  - *Three at resource recovery facilities*
- Conducted three compliance assistance visits at hazardous waste generators
- Issued 34 letters of warning and four notices of violation requiring actions to correct violations cited during the 92 inspections conducted
- Received and investigated a total of 50 citizen concerns regarding hazardous waste issues

Underground Storage Tank (UST) Compliance and Technology Unit (CTU)

Tank Inspection Contract: During the reporting period, the new tank inspection contract was awarded to Rounds and Associates. The inspection contractor conducts inspections of active underground and aboveground storage tanks for the department and the Missouri Petroleum Storage Tank Insurance Fund (PSTIF).

Operator Training: Operator training is now available online. Class A/B operator training and Class C operator training are both available, as well as a "test only" option. The draft rule is also available online, which includes a compliance deadline of July 1, 2016. The department and PSTIF will also be accepting reciprocity from some of our neighboring states. Stay tuned! The training program and draft rule may be found on the PSTIF webpage: http://optraining.pstif.org/intro/.

Federal Rule Changes: In 2011, EPA proposed significant changes to the UST regulations. The final version of those rules was published in July and will become effective Oct. 13, 2015. Please note, these rules are not yet effective in Missouri; they will not be effective in Missouri until we promulgate our own regulations or until EPA follows its procedures for withdrawal of our state program approval. The rule includes new testing requirements for release detection equipment, overfill prevention equipment (e.g. flapper valves, ball float valves and alarms), spill buckets and containment sumps. Previously deferred airport fuel hydrant systems and field constructed tanks will now be regulated. Missouri must also include a new requirement for all new systems installed after July 1, 2017, to be double walled with enhanced leak monitoring. For updates and information on these upcoming rule changes, please visit our webpage: http://dnr.mo.gov/env/hwp/ustchanges.htm.

Tank Inspections: State Fiscal Year 2016 contract inspections have started. Department inspections continue. As we have seen in previous years, Missouri owners, operators and contractors continue to demonstrate their proactive compliance by being responsive to issues when found, demonstrating a willingness to be a partner in ensuring all Missouri USTs are in compliance. The department is maintaining compliance with the EPA requirement of inspecting all regulated facilities at least every three years. The department must also demonstrate all facilities are either in compliance or are moving to gain compliance. This goal is much easier to accomplish when owners, operators, contractors and regulators are all working together.

Financial Responsibility: Efforts continue to resolve violations with facilities that did not maintain a financial responsibility (FR) mechanism to address releases and to protect third parties. Because of these efforts by UST CTU staff and the Attorney General's Office, the number of facilities without a verified financial responsibility mechanism continues to remain less than 1.5 percent.

Special Facilities Unit

Commercial Facility Inspectors: Special facilities inspectors conducted six inspections of commercial hazardous waste treatment/storage/disposal facilities (TSDs).

Polychlorinated Biphenyl (PCB) Inspector: The PCB inspector conducted 27 compliance inspections at various types of facilities throughout the state. The inspector's reports are forwarded to the EPA Region 7, which has authority for taking any necessary enforcement action regarding PCBs according to the Toxic Substances Control Act.

Hazardous Waste Transporters: The inspector conducted 13 commercial vehicle inspections. Two violation were cited and one commercial motor vehicle was put out of service. Also, 90 Hazardous Waste Transporter License background checks were completed.

Hazardous Waste Enforcement Unit

Enforcement Efforts

- Resolved two hazardous waste enforcement cases
- Received eight new enforcement cases

Greif Fenton

Greif Fenton manufactures 55-gallon steel drums and is registered as a large quantity generator of hazardous waste. Hazardous waste streams include waste fluorescent bulbs, waste solvent rags, waste silk screen solvent, waste paint related material, liquid from waste aerosol cans and used oil.

On May 7, 2013, and March 25, 2014, the department's St. Louis Regional Office (SLRO) conducted hazardous waste compliance evaluation inspections at Greif Fenton. A total of 25 violations were observed during the first inspection and 14 hazardous waste violations were observed during the March 25, 2014, inspection. A notice of violation was issued as a result of the inspection documenting the failure to determine if waste is hazardous, failure to use a licensed hazardous waste transporter, failure to use authorized hazardous waste treatment, storage, or disposal facility or resource recovery facility, and failure to update Notification of Regulated Waste Activity form.

The department conducted a targeted re-inspection on Oct. 8, 2014, and determined Greif Fenton had taken actions to resolve all of the violations observed during the previous inspections.

The facility and the department negotiated terms for a consent order effective May 8, 2015. Greif Fenton agreed to pay the sum of $14,700 as a penalty, of which $7,350 was paid to the St. Louis County School Fund and $7,350 will remain suspended on the condition that there are no violations of the order or the Missouri Hazardous Waste Management Law and/or Regulations for a period of one year from the effective date of the order. Due to the fact that Greif Fenton planned to close the facility, part of the order includes a stipulation for proper closure, clean-up and waste removal and a verification that the facility has been properly closed after ceasing operations.

Donovan Auto Body and Sales

On Aug. 9, 2011, March 28, 2012, and March 19, 2013, SLRO conducted hazardous waste inspections at Donovan Auto Body and Sales. On May 15, 2013, the department issued a NOV for violations including failure to determine if waste is hazardous, failure to use a licensed hazardous waste transporter, operating as an unauthorized TSD facility, failure to use an authorized TSD facility, storage

requirements, safety and emergency requirements, used oil requirements and generator notification requirements. On Sept. 18, 2013, the department inspected the facility and no violations were observed.

On March 12, 2014, and Aug. 5, 2014, the department sent penalty negotiation offer letters to the facility and never received an adequate response. On Feb. 19, 2015, the department issued an administrative penalty order to the facility. The facility appealed the order with the Administrative Hearing Commission (AHC). With legal assistance, the department and the facility agreed to a consent agreement outside of the AHC and it was executed on May 21, 2015. The facility has agreed to pay the sum of $16,400 as a penalty to the St. Louis County School Fund, of which $11,600 will remain suspended on the condition that there are no further violations of the order or the Missouri Hazardous Waste Law and/or Regulations for a period of three years of the effective date. The remaining amount of $4,800 shall be paid in monthly installments of $200 for a period of two years.

Pesticide Collection Events in the July-Sept. 2015 Quarter

The Pesticide Collection Program conducted three collections during the quarter. The events were a huge success, bringing in many toxic, banned pesticides. Many of the participants expressed gratitude for the service.

The pesticide collection event in Higginsville was on July 18. It was the third event for calendar year 2015 and collected approximately 11,750 pounds of waste pesticides from 32 participants. A couple of the participants delivered large amounts of pesticide resulting from recent land purchases in which they acquired unneeded pesticide along with the property.

The event in Owensville was on Aug. 15, 2015, collecting approximately 1,800 pounds of waste pesticide with 15 people participating.

The last event of calendar year 2015 was conducted on Sept.19, during which approximately 3,600 pounds of waste pesticide was collected from 38 people. This collection event was combined with Kirksville's household hazardous waste collection event. City officials were thrilled the pesticide collection program helped with collecting and disposing of all pesticides that entered the site.

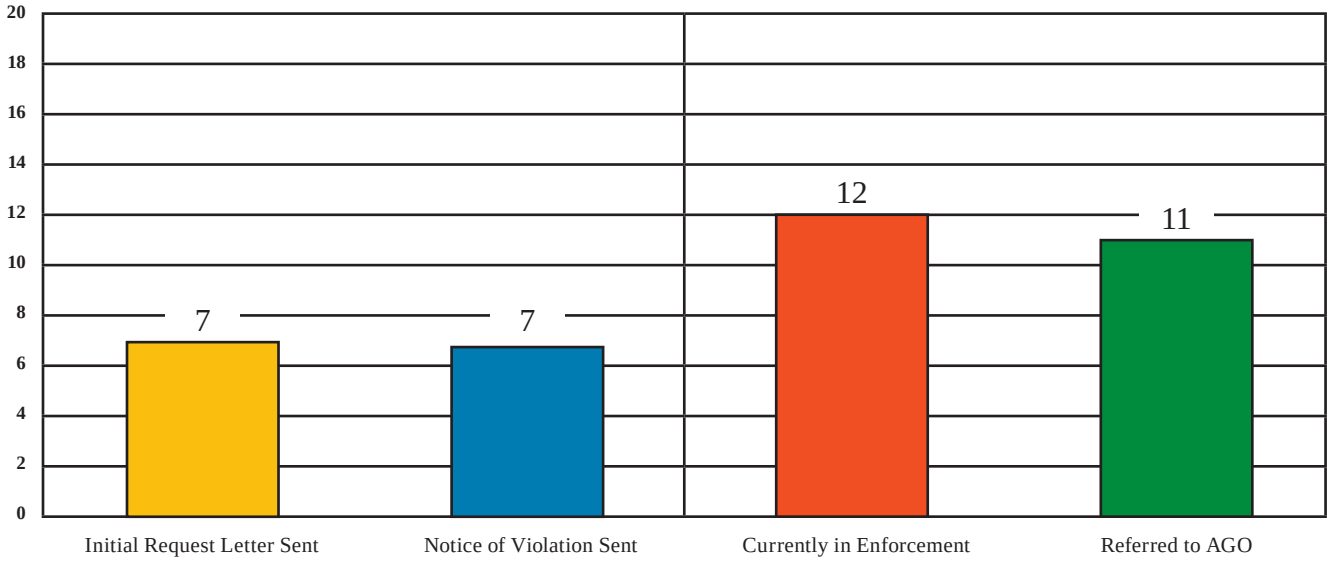
The pesticide collection event schedule for calendar year 2016 is being developed, targeting minimally funded solid waste districts and areas the pesticide program has not yet conducted an event. The program is planning to conduct six events for calendar year 2016.

In addition to the collection events, staff also promoted the Pesticide Collection Program by participating in the Cole County Fair and the Missouri State Fair. Two displays were constructed with the message focusing on integrated pest management versus the more toxic approach of applying pesticides to ward off pests. At the State Fair, staff from the University of Missouri – Fisher Delta Research Center also assisted in helping to promote the program. A PowerPoint presentation highlighting the successful pesticide collection event in Portageville and handouts were provided during this outreach event. In addition to these outreach efforts, staff are also preparing for the upcoming commercial pesticide applicator training in January 2016. Staff will provide information at this training on pesticide waste disposal, container cleaning and disposal and spill reporting.

Underground Storage Tank Facilities with Unknown Financial Responsibility Status Report

Financial Responsibility Status	Number of Facilities
Initial Request Letter Sent	7
Notice of Violation Sent	7
Currently in Enforcement	12
Referred to Attorney General's Office	11
Total Number of Facilities with Unknown Financial Responsibility	37

Number of Facilities in Each Financial Responsibility Step



*This semi-monthly report is derived directly from a copy of the UST Database and provides a "snapshot" of the status for each active underground storage tank facility not covered by a proper Financial Responsibility Mechanism.

25th National Tanks Conference

In September, two staff members from the Tanks Section attended the 25th National Tanks Conference. The conference provided a multitude of learning and networking opportunities. The 36 individual sessions had a wide range of topics, which included alternative fuels, remediation technologies and vital financial issues. With today's tank universe ever changing, information on these subjects is vital to the continued success of cleaning up contamination at tank sites in Missouri. Laura Luther, chief of the Risk-Based Corrective Action Unit, presented at a session titled "Long Term Stewardship & Institutional Controls." She discussed the department's development of an interactive map allowing users to conduct a search for investigations and cleanups, and other site information within a specific community or area of the state. Training sessions like these are instrumental in getting information out to all the states what is working in their state. With this knowledge in hand, hopefully, they can make improvements to their programs.

Tanks Section holds workshop at the Missouri Waste Control Coalition Conference

The Tanks Section held a Tanks Workshop on July 14, 2015, as part of the MWCC at the Tan-Tar-A Resort at Lake of the Ozarks. This was the eighth annual workshop in conjunction with the MWCC events. This conference was targeted toward environmental consultants who provide services to tank owners and operators. The conference provided consultants with information and training regarding free product recovery and light non-aqueous phase liquid (LNAPL) conceptual site models.

The workshop included departmental staff, along with private consultants, private laboratories and others. The conference was well attended.

Missouri Department of Natural Resources - Hazardous Waste Program

Petroleum Storage Tanks Regulation June 2015

Staff Productivity	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	TOTAL
Documents received for review	197	213	213										623
Remediation documents processed	154	145	147										446
Closure reports processed	16	7	14										37
Closure notices approved	12	13	14										39
Tank installation notices received	6	6	10										22
New site registrations	3	2	6										11
Facility Data	**Jul-15**	**Aug-15**	**Sep-15**	**Oct-15**	**Nov-15**	**Dec-15**	**Jan-15**	**Feb-15**	**Mar-15**	**Apr-15**	**May-15**	**Jun-15**	**TOTAL**
Total in use, out of use and closed USTs	40,929	40,950	40,963										
Total permanently closed USTs	31,970	31,979	32,014										
In use and out of use USTs	8,955	8,967	8,945										
Out of use USTs	664	668	681										
Total hazardous substance USTs	403	403	405										
Facilities with in use and out of use USTs	3,441	3,444	3,441										
Facilities with one or more tank in use	3,209	3,210	3,203										

Closures

Underground Storage Tanks	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	TOTAL	All Yrs
Closure Reports Reviewed	16	7	14										37	
Closure Notices Approved	12	13	14										39	
Number of Tanks Closed (Closure NFA)	32	23	33										88	

Cleanup

Underground Storage Tanks													TOTAL	All Yrs
UST release files opened this month	4	9	10										23	6,713
UST cleanups completed this month	9	6	13										28	5,880
Ongoing UST cleanups	831	833	833											
Aboveground Storage Tanks														
AST release files opened this month	0	0	0										0	475
AST cleanups completed this month	2	0	1										3	301
Ongoing AST cleanups	175	175	174											
Both UST and AST														
Total release files-both UST & AST	0	0	0										0	79
Cleanups completed-both UST & AST	0	0	0										0	52
Ongoing cleanups-both UST & AST	27	27	27											
Unknown Source														
Total release files-unknown source	2	0	0										2	228
Cleanups completed-unknown source	1	0	0										1	211
Ongoing cleanups-unknown source	18	18	17											
Documents Processed	154	145	147										446	
*Reopened Remediation Cases	0	0	0										0	79

Note: Some measures are re-calculated each month for all previous months to reflect items added or edited after the end of the previous reporting period.

** Reopened Remediation Cases was added Nov. 18, 2009 - the cumulative total has been queried and a running total will be tracked/reported with the FY 2010 Tanks Section Monthly Reports.*

Effective December 2008 tanks with unknown substance will be included in total figures. Some measures are re-calculated each month for all previous months to reflect items added or edited after the end of the previous reporting period.